

What is claimed is:

1. A document binding apparatus for externally attaching to a printer apparatus, comprising:

a paper lead-in roller mechanism for leading a paper discharged from the printer apparatus;

5 a paper arranging mechanism for aligning a position of the paper;

a paper binding mechanism for binding the paper;

a paper discharge roller mechanism for discharging the paper.

2. The document binding apparatus according to Claim 1, further comprising a binding table receiving the paper discharged from the printer apparatus.

3. The document binding apparatus according to Claim 2, wherein a surface of said binding table is provided with non-slip treatment preventing misalignment of the arranged paper.

4. The document binding apparatus according to Claim 3, wherein the non-slip treatment is a non-slip member having a high coefficient of friction and provided by one of sticking and coating.

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5. The document binding apparatus according to Claim 4, wherein said non-slip member is a rubber sheet.

6. The document binding apparatus according to Claim 3, wherein the non-slip treatment is a non-slip processing directly carried out over said surface of said binding table.

7. The document binding apparatus according to Claim 1, wherein said paper binding mechanism is an electromotive stapler for binding a vicinity of a corner portion of the paper.

8. The document binding apparatus according to Claim 1, further comprising:

a stack tray for receiving the paper discharged by said paper discharge roller mechanism.

9. The document binding apparatus according to Claim 1, further comprising:

a control device for sequence controlling said paper lead-in roller mechanism, said paper arranging mechanism, said electromotive stapler and said paper discharge roller mechanism,

wherein a series of operations are executed, in which the paper discharged from the printer apparatus is

10 led and arranged, and the arranged paper is bound through a staple, and the bound paper is discharged.

10. The document binding apparatus according to Claim 1, further comprising:

a paper detecting sensor for detecting the paper discharged from the printer apparatus;

5 a paper lead-in starter for starting said paper lead-in roller mechanism in response to an ON signal of said paper detecting sensor;

10 a paper arranging starter for starting said paper arranging mechanism in response to an OFF signal of said paper detecting sensor;

a comparator for comparing an OFF continuation time taken after said paper detecting sensor is turned OFF with a reference time;

15 a binding starter for starting said paper binding mechanism when the OFF continuation time exceeds the reference time; and

a discharge starter for starting said paper discharge roller mechanism after binding by said paper binding mechanism.

11. The document binding apparatus according to Claim 10, further comprising:

a counter for measuring the number of ON operations

of said paper detecting sensor,

- 5            wherein said binding starter starts said paper binding mechanism when the number of the ON operations of said paper detecting sensor is two or more.

12.    The document binding apparatus according to Claim 10, wherein said paper detecting sensor includes a lever.

13.    The document binding apparatus according to Claim 1, wherein

         said paper lead-in roller mechanism includes a paper lead-in roller, and

- 5            said paper discharge roller mechanism includes a paper discharge roller, a paper discharge gear and a paper discharge driven roller, and

         said document binding apparatus further comprising:  
         a paper feeding motor;

- 10          a gear train for driving said paper lead-in roller and a paper discharge roller by said paper feeding motor;  
         a rotatable link arm including a shaft;  
         a torque limiter;

- a gear attached to said shaft of said link arm  
15          through said torque limiter and engaged with said paper discharge gear; and

         a power transmitting member,

         wherein said paper discharge roller is attached to

20 a tip portion of said link arm, and said paper discharge roller and said gear attached to said shaft of said link arm are coupled through said power transmitting member, and wherein, when said paper feeding motor is rotated in a forward direction, said paper lead-in roller is rotated in a forward direction to lead in a paper and a tip of said link arm is rotated in such a direction as to  
25 separate from a paper feeding path so that said paper discharge roller separates from said paper discharge driven roller, and

wherein, when said paper feeding motor is rotated  
30 in a reverse direction, the tip of said link arm is rotated in a direction of the paper feeding path so that said paper discharge roller comes in contact with said paper discharge driven roller, and said paper discharge roller is rotated in a forward direction, thereby discharging the paper.

14. The document binding apparatus according to Claim 13, wherein said power transmitting member is at least one of an intermediate gear or a timing belt.

15. The document binding apparatus according to Claim 1, wherein

said paper lead-in roller mechanism includes a paper lead-in roller and a paper lead-in gear, and

5 said paper discharge roller mechanism includes a

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paper discharge roller and a paper discharge gear, and  
said document binding apparatus further comprising:  
a paper arranging rotation brush;  
a paper arrangement gear;  
10 a main case provided with said paper lead-in gear,  
said paper discharge gear and said paper arrangement gear;  
an openable cover assembled into said main case and  
provided with said paper lead-in roller, said paper  
discharge roller and said paper arranging rotation brush;  
15 and  
gears provided on respective shafts of said paper  
lead-in roller, said paper discharge roller and said paper  
arranging rotation brush, and respectively engaged with  
said paper lead-in gear, said paper discharge gear and said  
20 paper arrangement gear in order to transmit a power in a  
state that said cover is closed.

16. The document binding apparatus according to Claim  
1, wherein said paper lead-in roller mechanism includes:

a paper lead-in roller; and  
a paper lead-in driven roller provided in contact  
5 with said paper lead-in roller and having a gear-shaped  
section.

17. The document binding apparatus according to Claim  
1, wherein said paper discharge roller mechanism includes:

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a paper discharge roller; and

a paper discharge driven roller provided in contact  
5 with said paper discharge roller and having a gear-shaped  
section.

18. The document binding apparatus according to Claim  
16, wherein said paper discharge roller mechanism includes:

a paper discharge roller; and

a paper discharge driven roller provided in contact  
5 with said paper discharge roller and having a gear-shaped  
section.

19. The document binding apparatus according to Claim  
13, wherein said paper lead-in roller mechanism further  
includes a paper lead-in driven roller provided in contact  
with said paper lead-in roller and having a gear-shaped  
5 section.

20. The document binding apparatus according to Claim  
13, wherein said paper discharge driven roller of said  
paper discharge roller mechanism has a gear-shaped section.

21. The document binding apparatus according to Claim  
19, wherein said paper discharge driven roller of said  
paper discharge roller mechanism has a gear-shaped section.

22. The document binding apparatus according to Claim  
2,

wherein said binding table includes a right wall  
surface and a left wall surface, and

5 wherein said paper arranging mechanism includes:

a paper arranging pusher formed to be protruded  
from one of said right wall surface and said left wall  
surface into said binding table and to be retreated  
therefrom;

10 a cam mechanism for reciprocating said paper  
arranging pusher;

a paper arranging rotation brush mechanism provided  
between said right wall surface and said left wall surface;

a motor; and

15 a gear train for driving said cam mechanism and  
said paper arranging rotation brush mechanism by said  
motor,

wherein a side surface of the paper introduced into  
said binding table is pushed by said paper arranging pusher  
20 to carry out alignment in a transverse direction, and a  
surface of the paper is swept by said paper arranging  
rotation brush to carry out alignment in a longitudinal  
direction.



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23. The document binding apparatus according to Claim 22, further comprising an openable cover, and

wherein said paper arranging mechanism further includes a tension coil spring and a crank pin to be  
5 rotated interlockingly with said paper arranging rotation brush, and

wherein said paper arranging rotation brush is provided on said openable cover, and said crank pin is coupled to said cover through said tension coil spring, and  
10 said paper arranging rotation brush is returned to an initial rotation position by tensile force of said tension coil spring when said cover is opened.

24. The document binding apparatus according to Claim 1,

wherein said paper binding mechanism is a electromotive stapler including a clincher and a driver and  
5 fixed into such a position that a staple hits on a corner portion of the paper put on said binding table, and

wherein a side edge portion of the paper enters a portion between said clincher and said driver and runs during lead-in of the paper, and the corner portion of the  
10 paper accumulated on said binding table is bound by said electromotive stapler.

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25. The document binding apparatus according to Claim 24, further comprising an openable cover including a paper guide provided on a back face thereof for controlling an upper limit position of the side edge portion of the paper, 5 said cover covering said electromotive stapler and said binding table,

wherein, the side edge portion of the paper is guided to a portion between said clincher and said driver by said paper guide.

26. The document binding apparatus according to Claim 25, wherein said paper guide of said cover is provided immediately before said electromotive stapler in a state that said cover is closed.

27. The document binding apparatus according to Claim 24, wherein a surface of said binding table is provided with non-slip treatment preventing misalignment of the arranged paper.

28. The document binding apparatus according to Claim 27, wherein the non-slip treatment is a non-slip member having a high coefficient of friction and provided by one of sticking and coating.

29. The document binding apparatus according to Claim 28, wherein said non-slip member is a rubber sheet.

30. The document binding apparatus according to Claim 27, wherein the non-slip treatment is a non-slip processing directly carried out over said surface of said binding table.

31. The document binding apparatus according to Claim 2, wherein said paper binding mechanism binds a vicinity of a corner portion of the paper put on said binding table, and said paper discharge roller mechanism discharges the paper put on said binding table.

32. A method of binding a document by a document binding apparatus externally attached to a printer apparatus, said method comprising the steps of:

leading a paper discharged from the printer apparatus;

aligning a position of the paper;

binding the paper; and

discharging the paper,

wherein said steps of leading the paper, aligning the position of the paper, binding the paper and discharging the paper are sequentially executed.

33. The method of binding a document according to Claim 32, further comprising the step of:

detecting the paper discharged from the printer apparatus.

34. The method of binding a document according to Claim 33, wherein said step of detecting the paper is executed by pushing a lever provided to the document binding apparatus.

35. The method of binding a document according to Claim 33, further comprising the step of:

comparing a continuation time taken after termination of detecting the paper with a reference time,

5 wherein:

said step of leading the paper starts in response to detection of the paper;

said step of aligning the position of the paper starts in response to the termination of detecting the paper;

10 said step of binding the paper starts when the continuation time exceeds the reference time; and

said step of discharging starts after said step of binding.

36. The method of binding a document according to Claim 35, further comprising the step of:

measuring the number of the detection of the paper discharged from the printer apparatus,

5 wherein said step of binding starts if the number of the detection is two or more.

37. The method of binding a document according to Claim 32, wherein:

said document binding apparatus includes a paper feeding motor;

5 said step of leading the paper is executed when the paper feeding motor is rotated in a forward direction; and

said step of discharging the paper is executed when the paper feeding motor is rotated in a reverse direction.

38. The method of binding a document according to Claim 32, further comprising the step of:

moving and entering a side edge portion of the paper between a clincher and a driver of a stapler provided  
5 to said document binding apparatus before binding the paper.

39. The method of binding a document according to Claim 32, further comprising the step of:

entering a side edge portion of the paper between a clincher and a driver of a fixed stapler provided to said  
5 document binding apparatus before binding the paper.